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## *Chelodesmid studies. XV. The identity and status of the generic name Strongylosomides Attems*[1]

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In an early paper describing new polydesmoids belonging to the Hamburg Museum, Graf Attems (1901) proposed to divide the genus *Leptodesmus* into three subgenera: the nominate subgenus, *Rhachidomorpha* de Saussure, and *Strongylosomides*, proposed as new. These taxa have had erratic subsequent histories. *Leptodesmus* itself became a very large and heterogeneous aggregation whose dismemberment and reclassification has only recently been undertaken. *Rhachidomorpha* as conceived by Attems was based on the characteristics of a Brasilian species he misidentified as *R. tarascus* (de Saussure, 1859); the two forms are in fact not even confamilial. Attems subsequently realized this error and in 1931 provided the new generic name *Cornalatus* for the Brasilian species, which, inexplicably, he continued to call *tarascus*. *Cornalatus* automatically became a junior objective synonym of Rhachidomorpha, of which *tarascus* is the type species by monotypy. Some years later (1938) Attems renamed the Brasilian species as *Cornalatus permutatus* so that it finally acquired its own identity even though too late to validate the generic name. *"Cornalatus" permutatus* does require separate generic status, but resolution of that problem is deferred for a later occasion.

This leaves *Strongylosomides*, based on a small Brasilian chelodesmid — named *petropolites* after its type locality — in which the paranota are reduced to small lateral ridges and the collum is narrower than the head (a result of its lateral ends being directed ventrad). In 1926 Attems elevated the name to generic rank, and in 1931 he included it in a key to chelodesmoid genera and provided also a diagnosis and gonopod drawing. Lastly, in 1938 Attems gave a formal treatment of the genus in Lief. 69 of the *Tierreich* series, at which time a second species, *Leptodesmus cylindricus* (Brolemann, 1902) was added. Subsequently, aside from passing mention in several papers by Otto Schubart, *Strongylosomides* has languished in obscurity.

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One might justly write "well-deserved obscurity" because the exact status of *S. petropolites* has never been adequately established. The original description was reasonably detailed, and included some drawings of gonopod structure. The latter, unfortunately, were prepared from an aspect which prevented them from being compared with gonopods of other chelodesmids drawn from the standard medial position. Attems had removed both gonopods from the holotype and flattened them into a dorsal orientation in his microscope preparation, so that all of his figures were drawn from this single atypical position. In 1979 I was fortunate in locating the poorly made and labeled preparation (the original mounting medium of which had almost entirely dried and disappeared) and was able to salvage the gonopods in fairly good condition. Thus an evaluation of *Strongylosomides* became possible nearly eight decades after the name was first published.

Although the genus cannot be confidently assigned to a particular tribe at this time, it nonetheless is desirable to establish *Strongylosomides* as a valid and easily recognizable taxon composed of numerous species described from southeastern Brasil.

The material on which this paper is based is located in the Zoologisches Museum Hamburg and I express my thanks to Dr. Gisela Rack for placing the collections under her care at my disposal.

## Strongylosomides.

*Strongylosomides* Attems, 1901, Mitt. Naturh. Mus. Hamburg, vol. 13, p. 89. Proposed as a subgenus of *Leptodesmus*. Monobasic with a new species, *L. (S.) petropolites*, from Brasil.

*Strongylosomides* (as genus): Attems, 1931, Zoologica, vol. 30, heft 79, p. 51; 1938, Das Tierreich, lief, 69, p. 97. — Schubart, 1955, Arq. Mus. Nac. Brasil, vol. 42, p. 510.

Diagnosis: Very small to small chelodesmids (length of males ca. 12-30 mm) in which the paranota are reduced to low longitudinal ridges or, if larger, strongly depressed ventrad imparting a strongly convex aspect to the animal, their anterior and lateral edges forming a continuous even curve; ozopores in normal sequence, opening laterally in ovid posterior expansion of peritremata; metaterga smooth and polished, without transverse sulcus. Epiproct small, conical, apically somewhat decurved; paraprocts and hypoproct unmodified. Pleurosternal carinae usually present and visible as far back as 17th segment. Sterna posterior to gonopods broad, flattened, glabrous or nearly so, without subcoxal spines or other modification. Legs relatively short and stout, usually unmodified but subtarsal tibial pads and apical prefemoral knobs present in a few species. Color uniformly dark maroon to black, without colorful paranotal or median dorsal spots.

Sterna of segments 4, 5, and 6 of males with paramedian conical or somewhat transverse processes, their form varying in individual species. Legs of these segments without femoral glands or processes. Gonopods of moderate size, set in oval aperture. No trace of median sternal remnant, coxae abut along a long sinuous line of contact (Fig. 6). Acute slender coxal apophysis present, with

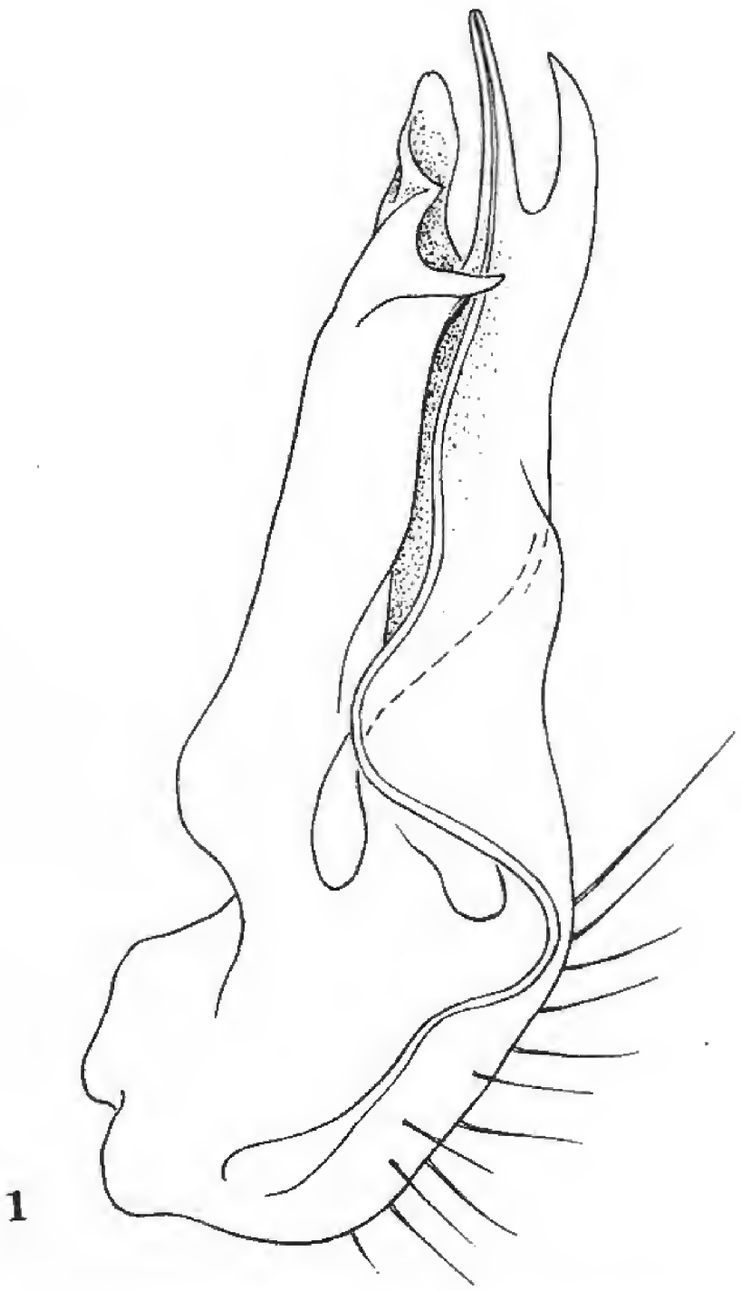



Fig. 1. *Strongylosomides petropolites* (Attems). Telopodite of left gonopod of male holotype, mesal aspect. Scale represents 1.0 mm.

(usually) a single dorsal macroseta at its base; no setae subtending cannula on medium side. Cannula unmodified. Telopodite relatively short and robust, set against coxa at nearly a right angle; prefemur with large process, apically expanded and partially enclosing acropodite; latter simple, with distinct trace of cingulum on lateral side at about midlength, apically with small slender solenomerite and tibiotarsal process of generally similar size and shape; no trace of torsion. Prostatic groove visible for its entire length, running obliquely from its base to ventral surface of prefemur, thence abruptly reflexed dorsad across prefemur and proceeding to solenomerite along dorsomedian edge of acropodite (Fig. 7).

Distribution: Southeastern Brasil, from vicinity of Rio de Janeiro to the northeastern municipalties of Sao Paulo, at moderate to high elevations.

Referred species: Eight, listed below. Some of these may perhaps be shown to be subspecifically related. Many additional species are to be expected.

Commentary: *Strongylosomides* was really based primarily upon the reduced state of the paranota in its type species, an adaptive character of somewhat marginal taxonomic importance. Attems' assignation of *Leptodesmus cylindricus* to the genus in 1938 was made for the same reason, and was only fortuitously correct. In 1951 Schubart described a close relative of *petropolites* from Est. RJ, Brasil, with the perceptive remark "The little black *L. maritimus* possesses likewise short keels. As to the structure of the gonopods it forms with *L. azevedoi* and *L. soaresi* a well distinguished group, characterized by the curvature of the sperm canal, the division between the femur and postfemur, and the peculiar form of the prefemoral process." Curiously Schubart overlooked the fact that Brolemann's good drawings of *cylindricus* show the same configuration; had he placed more emphasis on gonopods and less on superficial body-form characters Schubart might have come thirty years ago to the very same conclusions presented in this paper.

These are, in summary, that *Strongylosomides* is a valid and easily recognized taxon made up of small to very small, dark-colored millipeds having a similar body form, sternal ornamentation, and basic gonopod pattern, all confined to a compact and continuous geographic range generally between the cities of Rio de Janeiro and Sao Paulo.

Since it is virtually impossible to verbalize subtle differences in gonopod structure in an intelligible way, reference to drawings is required for the identification of species. For this reason I forego attempting to prepare a traditional dichotomic key. Following a chronologically structured list of species, I append some comments on apparent species-groups, however.

**Strongylosomides petropolites** Attems.—Fig. 1.

*Leptodesmus (Strongylosomides) petropolites* Attems, 1901, Mitt. Mus. Hamburg, vol. 13, p. 89, figs. 13-15, 36. Holotype (body apparently lost, only the gonopods are now extant) Zool. Mus. Hamburg, from Petropolis, Mun. Petropolis, Edo. Rio de Janeiro, Brasil, Dr. F. Ohaus leg.

*Strongylosomides petropolites:* Attems, 1931, Zoologica, vol. 30, heft 79, p. 51, fig. 74; 1938, Das Tierreich, lief. 69, p. 98, fig. 114.

As remarked in a previous paragraph, Attems' original drawings of the gonopods of this species are entirely accurate but made from a dorsal aspect in which a number of important details are not evident. Figure 1 shows the left gonopod telopodite in mesal aspect and clearly presents characters shared with the seven other referred species. From Attems' noncommital description of leg and sternum structure it may be presumed at least that tibial pads are probably not present in this species.

Attems could not determine the length of the holotype, but stated its width to be 2 mm. Judged from the proportions of related species, males of *petropolites* must be about 12 mm. long, a dimension which ranks the species among the smallest known chelodesmids (*Trichomorpha reducta* Carl is only 19 mm. long and 1.2 mm. wide).

**Strongylosomides virgulatus** (Attems), comb. nov.—Figs. 2-8.

*Leptodesmus virgulatus* Attems, 1901, Mitt. Naturh. Mus. Hamburg, vol. 13, p. 91, figs. 19-21. Male lectotype and two lectoparatypes, Zool. Mus. Hamburg, from Petropolis, Mun. Petropolis, Est. Rio de Janeiro, Brasil; Dr. F. Ohaus leg. 1898).

*Leptodesmus (Leptodesmus) virgulatus:* Attems, 1938, Das Tierreich, lief. 69, p. 24 (description only; the gonopod shown in fig. 22 is that of *Cornalatus permutatus* Attems, 1938, the result of some kind of transposition).

The accompanying figures are made from the lectotype to show details of gonopod and peripheral structure. To be especially noted is the occurrence of small, acute, apical prefemoral spines (Fig. 5), not previously remarked for this or other species and therefore requiring future inspection.

**Strongylosomides cylindricus** (Brolemann)

*Leptodesmus cylindricus* Brolemann, 1902, Revista Mus. Paulista, vol. 5, p. 71, figs. 50-55. Male holotype (?Mus. Zool. Univ. Sao Paulo), from Piquete, Mun. Piquete, Est. Sao Paulo, Brasil; January 1897 [H. von Ihering, leg.?].

*Strongylosomides cylindricus:* Attems, 1938, Das Tierreich, lief. 69, p. 98, fig. 115.—Schubart, 1955, Arq. Mus. Nac., vol. 42, p. 510.

Brolemann's detailed description and precise illustrations leave nothing to be desired. His figures 52 and 53 show very clearly the apparent segmentation of the gonopod acropodite on the lateral side. *S. cylindricus* is one of the few members of the genus with prominent apical tibial pads and is also unusual in having the peritremata and posterior edge of the metazona reddish.

**Strongylosomides cognatus** (Brolemann), comb. nov.

*Leptodesmus cognatus* Brolemann, 1902, Revista Mus. Paulista, vol. 5, p. 73, figs. 56-60. Male and female syntypes (Mus. Zool. Univ. Sao Paulo) from "Alto da Serra" [=Paranapiacaba], Mun. Sto. Andre, Est. Sao Paulo, Brasil.

*Camptomorpha cognata:* Attems, 1938, Das Tierreich, lief. 69, p. 72, fig. 84.—Schubart, 1955, Arq. Mus. Nac., vol. 42, p. 511.

*Camptomorphoides cognata:* Schubart, 1962, Rev. Brasil. Biol., vol. 22, p. 254.

This species likewise appears to be known only from the original material. As in *cylindricus* the tibiae are provided with apical pads. The gonopods are very similar to those of *S. petropolites* except for loss of the tibiotarsal process (a presumably secondary reduction shared with *S. virgulatus).*

**Strongylosomides azevedoi** (Schubart), comb. nov.

*Leptodesmus azevedoi* Schubart, 1945, Pap. Avuls. Dept. Zool. S. Paulo, vol. 6, p. 306, figs. 4, 5. Male holotype (Mus. Zool. Univ. Sao Paulo), from Monte Alegre, Mun. Amparo, Edo. Sao Paulo, Brasil; O. Schubart leg. 1 November 1943.

**Strongylosomides maritimus** (Schubart), comb. nov.

*Leptodesmus maritimus* Schubart, 1951, Bol. Mus. Nac. (N.S.) no. 101, p. 7, figs. 3, 4. Male holotype (Mus. Nac. Brasil.) from Ilha Grande, Edo. Rio de Janeiro, Brasil, H. Sick leg. 14 June 1944.

**Strongylosomides soaresi** (Schubart), comb. nov.

*Leptodesmus soaresi* Schubart, 1946, An. Acad. Brasil. Cienc., vol. 18, p. 175, fig. 6. Male holotype (Mus. Zool. Univ. Sao Paulo), from Fazenda Floresta, Ipiabos, Mun. Barra de Pirahy, Edo. Rio de Janeiro, Da. L. M. Morais leg. 11 September 1944.

In many respects this is a somewhat disjunct species, whose status vis-a-vis other members of the genus is discussed in the following section. In the original description Schubart remarked that "Esta especie merece talvez um subgenero, por causa dos gonopodios estranhos do tipo normal. Existe alem do prefemur com o processo prefemoral um femur nitidamente separado do postfemur." This observation is entirely accurately when *soaresi* is compared to the other eleven species described in the same paper, but Schubart overlooked that the characters he mentioned as "estranhos" occur also in *S. cylindricus*, which following Attems he himself admitted to *Strongylosomides*.

**Strongylosomides nuptae** (Schubart), comb. nov.

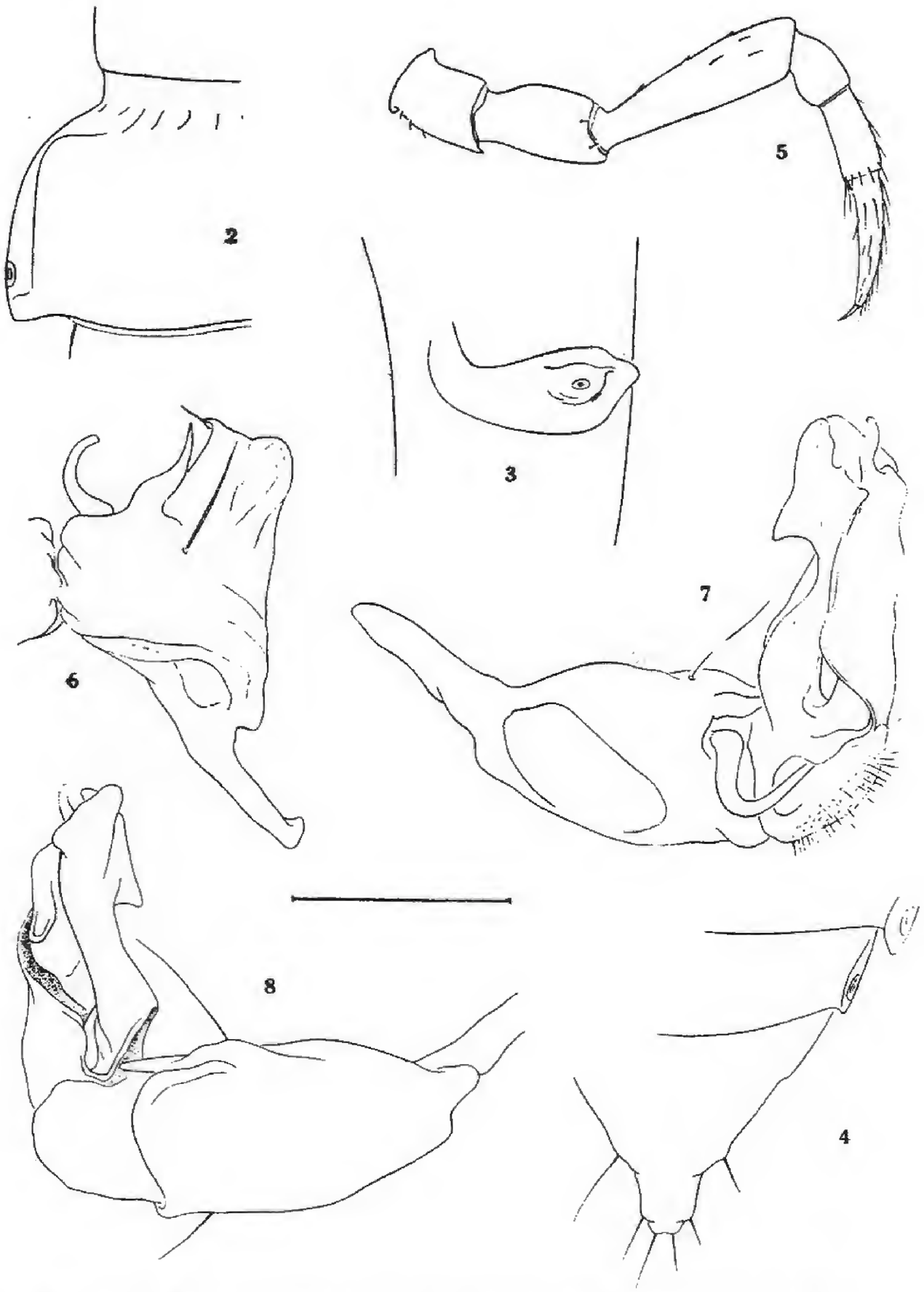
*Leptodesmus nuptae* Schubart, 1955, Arq. Mus. Nac., vol. 42, p. 524, fig. 21. Male holotype (Mus. Zool. Univ. Sao Paulo) from Veu das Noivas, Itatiaia, Mun. Rezende, Est. Sao Paulo, Brasil; Da Jandira Schubart leg. 17 November 1945.

## SPECIES GROUPS

On the basis of their overall appearance, the gonopods of the eight species enumerated above suggest that four groups may be recognized, and to a large extent these distinctions are confirmed by the occurrence of peripheral characters.

All but one of the species are generally very similar in gonopod structure, as exemplified by Figs. 1 and 7 of this paper. The exceptional form is *S. soaresi*, in which the coxa is provided with only a rudimentary dorsal apophysis, the apical elements of the acropodite are curved about 90° dorsad, and the separation of femoral and postfemoral regions is emphasized by a proximad reflexion. Moreover, this species is yellowish dorsally and the 6th sternum of the male lacks paramedian processes. Collectively these differences set *soaresi* apart as the most disjunct member of the genus, in its own monobasic group.

*S. cylindricus* is unusual in that the prefemoral process of the gonopod is appreciably shorter than the acropodite. Apical elements of the latter are also directed dorsad at about a 45° angle. While *cylindricus* is basically dark in dorsal color, it differs from the other six sombre species in having the peritremata and transverse metazonal bands reddish. While generally not so deviant as *soaresi*, *cylindricus* may still merit assignment to its own group.




Figures 2-8. *Strongylosomides virgulatus* Attems). 2, left paranotum of 10th segment, dorsal aspect. 3, lateral aspect of same paranotum. 4, posterior segments, dorsal aspect. 5, leg from midbody segment, showing small apicoventral prefemoral spine. 6, coxa of right gonopod, dorsal aspect. 7, left gonopod, mesal aspect. 8, left gonopod lateral aspect. Scale represents 2.0 mm for Figs. 2-5, 1.0 mm for Figs. 6-8. All drawings from holotype.

The remaining six species are much more homogeneous, and appear to form a third, equivalent group. Yet they can be segregated easily into two subgroups on the basis of the prefemoral process, as seen in mesal aspect.

In the first of these the process tends to be relatively long, straight, and simple in form, much as is shown in Figure 1. Species so distinguished are *petropolites, azevedoi,* and *cognatus.*

In the second, the prefemoral process is shorter, broader, more elaborate in outline, and envelopes the acropodite to a greater extent, as shown by Figure 7. One easily noted character is the common presence of a sharp retrorse subapical projection on the dorsal side of the process. Included in this subgroup are the species *virgulatus, maritimus,* and *nuptae.*

One member of each group *(cognatus* and *virgulatus)* differs somewhat in lacking the usual tibiotarsal process. Weighing this character against the overall appearance of the gonopods, I am inclined to consider it to be one reflecting independent parallel reduction and of slight importance in indicating affinities.

Geographically the three members of the *petropolites* subgroup are located at the extreme ends of the known generic range. The trio composing the *virgulatus* subgroup are more closely aggregated in the northeastern third of the area and are close enough to suggest the possibility of their being found conspecific.

Since additional species doubtless remain to be discovered and documented in this genus, the foregoing groupings must be regarded as provisional and subject to dissolution or rearrangement.

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